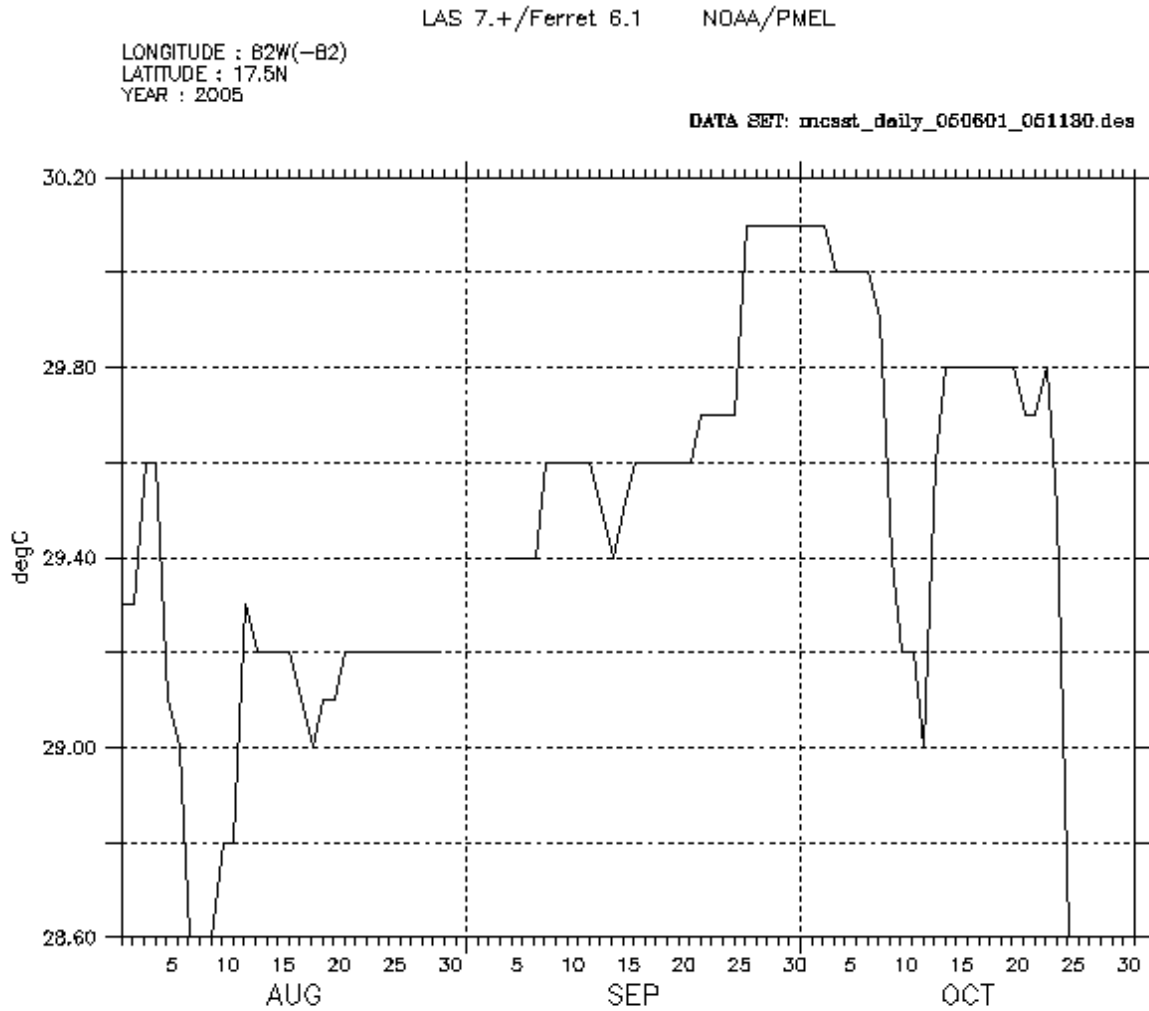


Lesson 23: Coral Bleaching in the Caribbean (51)

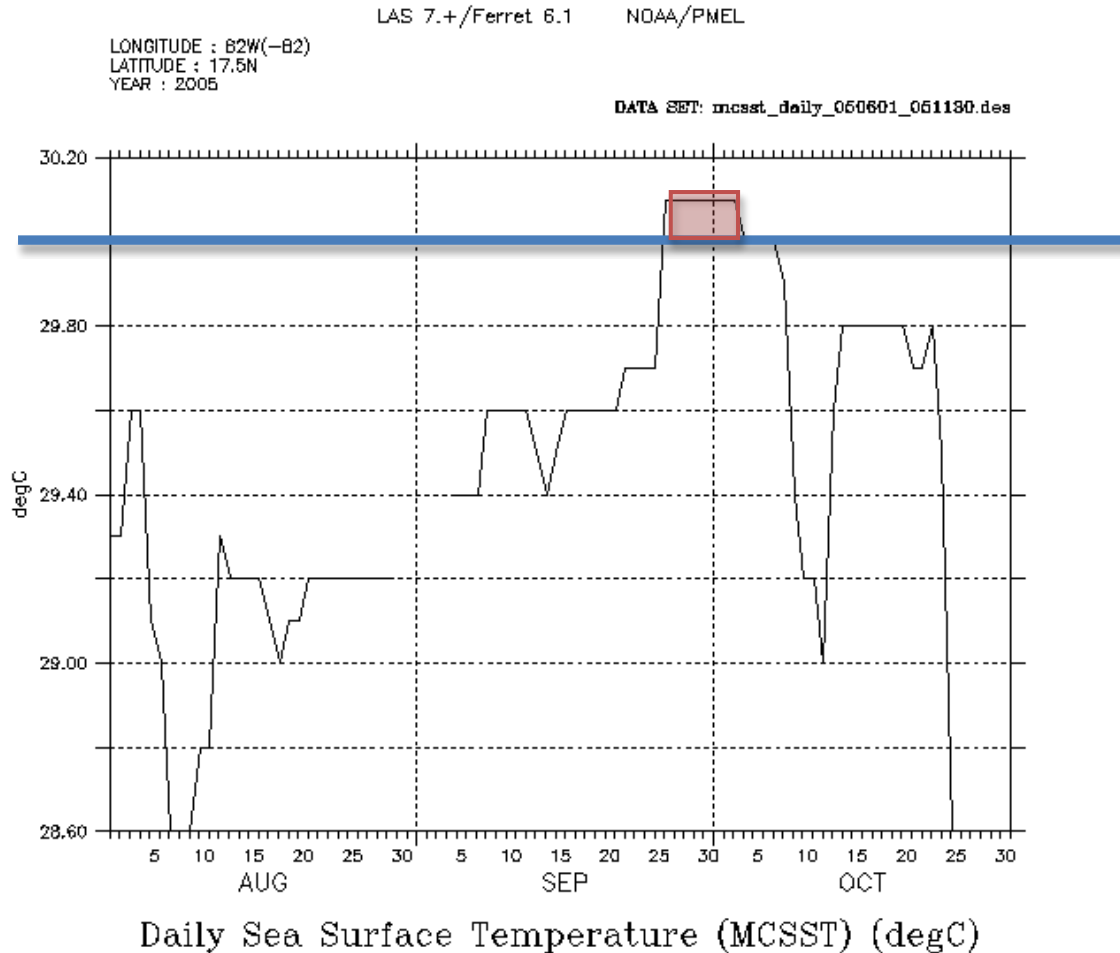
Example Graph (another example, similar to this but with a slightly different longitude and latitude, can be found in the lesson links. Charts will vary depending on choice of location.)



Daily Sea Surface Temperature (MCSST) (degC)

Questions:

1. On the temperature graph you created for your location, use your ruler and a blue colored pencil to draw a horizontal line at 30C. Did the sea surface temperature exceed 30C at any time during your time series? Using a red colored pencil, carefully shade the area between the red SST line and the blue line you drew.



2. The blue line represents the observed temperature criteria for coral bleaching to occur. Examine your red-shaded areas. For what period of time was the SST equal to or higher than the bleaching threshold? Was it long enough to cause coral bleaching? Do you think it was long enough to cause massive coral die off?

The temperature (in this example graph) was over 30 C for about 7 days, or one week. Coral bleaching is caused when temperatures are unusually warm for a week or longer, so coral bleaching most likely occurred in this situation. Students should explain their reasoning behind the probability of bleaching occurring.

Extensions:

Read the Extension Activity News Article in Lesson Links and answer the questions below.

1. Increased sea surface temperature increases both the intensity of hurricanes and coral reef bleaching. Then how can hurricanes reduce the risks of coral bleaching?

Once a hurricane has gone through an area, it decreases the water temperature. An example of this is when Hurricane Katrina led to less bleaching in the Florida Keys in 2005 due to the drop in temperature following her path through the area. Although

hurricanes can cause some damage, they ultimately lower the risks of coral bleaching by lowering the temperature of the water, which is one of the main causes of coral bleaching.

2. How will global warming affect sea surface temperatures, hurricane intensity, and coral bleaching?

Global warming is causing an increase in temperature in both the land and the sea worldwide. This will in turn cause stronger hurricanes, which can damage both human and coral colonies. Since the water will be a warmer temperature, even if the hurricane lowers the temperature a little bit overall the coral will not be very protected from the bleaching and bleaching will begin to worsen and wipe out more coral colonies.

Read and discuss the information on the lesson link ‘Things you can do to protect coral reefs’.

More information about coral bleaching:

Here are a couple of pretty extensive collections that you can use to ground-truth the investigations:

Widespread coral bleaching observed at Buck Island, St. Croix, US Virgin Islands, October 2005

http://ccma.nos.noaa.gov/products/biogeography/coral_bleaching/

Scroll to table at the end of the page, and you'll see dozens of photos from the 2005 event from the USVI, with corals ID'd by species

Another very good collection is found here:

http://www8.nos.noaa.gov/biogeography_public/reef_photos.aspx

Where you can choose from three additional sites, many dates, and down to the spp level (incl corals, fish, algae, etc), to retrieve the images you want. You can just select "Hard Corals" in the dial on top and get many images, though you are forced to select a single month.

Finally, if you are interested in other data-centered activities: we've just developed our new ocean acidification module that uses current and real data on OA and links it to coral reefs:

<http://www.dataintheclassroom.org/content/oa/>